REMARKS

In the Office action mailed June 9, 2008, claims 1 and 3-4 were rejected under 35 USC §103 for allegedly being obvious over JP 2002-012990 in view of US Patent 5,211,663 to Kovacs et al.

Claims 5-8 were rejected under 35 USC §103 for allegedly being obvious over US 2003/0162077 to Ohtani et al. in view of US Patent 6,440,598 to Fukui et al., and further in view of US 2003/0034095 to Heimann et al.

Claim 9 was rejected under 35 USC §103 for allegedly being obvious over the '077 document to Ohtani in view of the '598 patent to Fukui and the '095 document to Heimann, and further in view of US Patent 4,497,667 to Vashi.

Applicant would like to thank the Examiner for the careful consideration given the present application. The application has been carefully reviewed in light of the Office action, and the following amendments and explanations are provided to more clearly and particularly describe the subject matter which applicant regards as the invention.

Claims 1 and 3-9 are presented for the Examiner's consideration.

A. Rejection of Claims 1 and 3-4 Under 35 USC §103 Based on JP 2002-012990 in View of US Patent 5,211,663 to Kovacs Must be Withdrawn

Independent claim 1 recites a method for forming a passive film on a surface of a stainless steel member. The method calls for immersing the stainless steel member in an alkaline solution of pH 9 to 12 at 40 to 60°C. The method also recites air bubbling the alkaline solution, added with a pH buffer, or provided with a pH buffer action. Claim 1 additionally recites that the amount of oxygen dissolved in the alkaline solution is increased to promote the formation of hydroxides constituting the

passive film. Claim 1 additionally recites that as a result of carbon dioxides dissolving in the alkaline solution, falling of the solution pH is suppressed. Claim 1 continues and recites that the hydroxides constituting the passive film are produced from metal ions constituting the stainless steel and hydroxide ions.

Specifically, claim 1 requires an operation of "air bubbling." The specification of the present application defines air bubbling as, "[a]ir bubbling means blowing air into the process liquid 12 to increase the amount of dissolved oxygen in the process liquid 12 and thereby promote hydroxide formation." See p. 12, lines 19-21.

In sharp contrast, the JP '990 document utilizes an entirely different phenomenon for inhibiting corrosion on a metal workpiece, i.e. through the use of cavitation. Cavitation does not involve introducing additional amounts of air into a liquid as recited in claim 1. Instead, cavitation is the phenomenon of formation of vapor bubbles in a flowing liquid in a region where the pressure of the liquid falls below its vapor pressure. Cavitation typically occurs in a liquid immediately behind the blade of a rotating propeller, for example.

In order to further distinguish the claimed subject matter of claim 1 from the cited JP '990 document, claim 1 has been amended to specifically recite that external air is bubbled into the alkaline solution. This clearly distinguishes claim 1 from the JP '990 document. No new matter is added by this clarification since support is found throughout the present application and particularly at page 12, lines 19-21.

Therefore, the JP '990 document does not describe "air bubbling" in which external air is blown into the process liquid. Instead, the JP '990 document describes cavitation, which is an entirely different phenomenon. In fact, if one followed the teachings of the JP '990 document, one would be led away from the

process of the present invention. As previously explained, cavitation forms vapor bubbles in a liquid by reducing the pressure in a region of the liquid, hence there is no need to introduce air external to the liquid. An artisan following the teachings of the JP '990 document would not be motivated to configure a source of pressurized air or employ an air pump in order to blow external air into a process liquid. "[A]n applicant may rebut a prima facie case of obviousness by showing that the prior art teaches away from the claimed invention in any material respect." *In re Peterson*, 315 F.3d 1325, 65 USPQ2d 1379 (Fed. Cir. 2003).

For at least these reasons, it is submitted that the Examiner will appreciate that the rejection based upon the JP '990 document is deficient and should be withdrawn.

The Examiner admits that the JP '990 document fails to teach the treatment temperature of 40-60°C recited in claim 1. Apparently, for this reason, the Examiner relies upon the '663 patent to Kovacs. Although Kovacs describes using a solution having a temperature of from 20°C to 50°C, Kovacs fails to remedy other deficiencies of the JP '990 document.

Kovacs describes a method of passivating surfaces of stainless steel medical implants. The methods taught by Kovacs use the salts of water soluble metals in combination with "non-aggressive oxyanions" (oxyanions are polyatomic ions containing oxygen) which are said to be sulfate, phosphate, di-hydrogen phosphate, mono-hydrogen phosphate, borate and the like, see col 4., lines 2-4; and col 5, lines 39-41. The methods of the claims at issue do not require the use of the noted oxyanions.

Moreover, Kovacs forms passivating coatings by excluding "aggressive oxyanions" from the passivating solutions, see col 4, lines 13-18. A well known

example of an aggressive oxyanion is the carbonate anion, CO_3^{-2}. The presently claimed passivation treatments utilize the carbonate anion by "air bubbling the alkaline solution" (claim 1). As shown in the present application on page 13, air bubbling is used to promote the generation of hydrogen H^+ in the reactions:

$$CO_2 + H_2O \rightarrow HCO_3^- + H^+ \qquad (d)$$

$$HCO_3^- \rightarrow CO_3^{-2} + H^+ \qquad (e)$$

Thus, the systems associated with the pending claims utilize a carbonate anion. Kovacs expressly teaches away from systems using such anions:

> In both the spontaneous and galvanic surface passivation methods, aggressive oxyanions and chloride ions are excluded from the passivating solutions resulting in a more uniform barrier film which is less prone to localized breakdown processes when placed into the biological environment. Additionally, since the nature of the inventive passivating solutions is more similar to that of body fluids, than nitric acid, the protective ability of the invention passive film, when exposed to the body fluids, undergoes much less alteration. The inventive methods also reduce the disadvantageous effects of initial surface conditions on the effectiveness of passivation. This is largely due to the absence of aggressive species that may further enhance the non-uniform character of the initial surface film.

Col 4, lines 13-27 of the '663 patent to Kovacs.

Thus, Kovacs also teaches away from the presently claimed subject matter. "A reference may be said to teach away when a person of ordinary skill, upon reading the reference,....would be led in a direction divergent from the path that was taken by the applicant." *Tec Air, Inc. v. Denso Manufacturing Michigan, Inc.*, 192 F.3d 1353, 52 USPQ2d 1294 (Fed. Cir. 1999). Clearly, Kovacs teaches away from the present invention since Kovacs explicitly states that aggressive oxyanions are to be excluded, while the present invention uses such oxyanions.

Furthermore, it is not appropriate to combine the teachings of the JP '990 document with the '663 patent to Kovacs. In the event such references were somehow combined, one would be left with a collective teaching of attempting to use a cavitation jet on a solution containing "non-aggressive oxyanions." It is unknown

whether a passivating layer could even be deposited from such a system. This combined teaching would in no way, teach, describe or even suggest the particular methods recited in the claims at issue. "If when combined, the references 'would produce a seemingly inoperative device,' then they teach away from their combination." *Tec Air, Inc. v. Denso Manufacturing Michigan, Inc.*, 192 F.3d 1353, 52 USPQ2d 1294 (Fed Cir. 1999) citing *In re Sponnable*, 405 F.2d 578, 587, 160 USPQ 237, 244 (CCPA 1969).

For at least these reasons, it is submitted that independent claim 1 is patentable over the limited teachings of the JP '990 document and the '663 patent to Kovacs. Since claim 1 is patentable over the cited art, so too are claims 3 and 4 dependent therefrom.

B. Rejection of Claims 5-8 Under 35 USC §103 Based on US 2003/0162077 to Ohtani in View of US Patent 6,440,598 to Fukui, and Further in View of US 2003/0034095 to Heimann Must be Withdrawn

Independent claim 5 recites a method for manufacturing a stainless steel separator for use in a fuel cell. The method comprises applying a lubricant to a stainless steel thin sheet and press-forming gas flow passages and cooling water flow passages in the sheet. Lubricant adhered to the stainless steel thin sheet is removed by spraying the sheet with an alkaline solution for cleaning. The alkaline solution is removed from the stainless steel thin sheet by spraying washing water onto the sheet. Wash water is removed by spraying ion-exchange water onto the stainless steel thin sheet. An alkaline solution for passivation treatment is sprayed onto the stainless steel thin sheet to passivation-treat the sheet. The alkaline solution for passivation treatment that is adhered to the stainless steel thin sheet is

removed by spraying ion-exchange water onto the stainless steel thin sheet. The stainless steel thin sheet is then dried.

The '077 document to Ohtani, although describing a method of manufacturing and passivating a fuel cell metallic separator; fails to teach, describe, or even suggest the particular method recited in claim 5. Instead, Ohtani describes using a grinding process in which a pressed metal blank is exposed to wet abrasive blasting.

Specifically, Ohtani fails to describe, teach, or even suggest the many features in claim 5 such as "a step of applying a lubricant to a stainless steel thin sheet and press-forming gas flow passages and cooling water flow passages in it." Ohtani also fails to describe, teach, or suggest "a step of removing lubricant adhered to the stainless steel thin sheet by spraying the press-formed stainless steel thin sheet with an alkaline solution for cleaning." Ohtani also fails to describe, teach, or suggest "a step of removing alkaline solution for cleaning adhered to the stainless steel thin sheet by spraying washing water onto the stainless steel thin sheet." Ohtani also fails to describe, teach, or suggest "a step of removing washing water remaining on the stainless steel thin sheet by spraying ion-exchange water onto the stainless steel thin sheet."

Regarding passivation, although Ohtani describes performing such an operation, Ohtani actually employs an entirely different passivation procedure than that recited in the claims at issue. This is a clear example of teaching away from the claims at issue. Instead of using an "alkaline solution" as called for in the pending claims, Ohtani uses nitric (or nitride) acid, see paragraphs [0078] and [0092] of the '077 document. The problems of using nitric acid for passivation are described in the background section of the present application. The present invention provides a superior alternative to such known passivation methods.

Thus, Ohtani fails to describe, teach, or suggest "a step of spraying an alkaline solution for passivation treatment onto the stainless steel thin sheet to passivation-treat the stainless steel thin sheet." And thus, it follows that Ohtani also fails to describe, teach, or suggest "a step of removing alkaline solution for passivation treatment adhered to the stainless steel thin sheet by spraying ion-exchange water onto the stainless steel thin sheet." And, as noted, Ohtani actually teach away.

The '598 patent to Fukui fails to remedy the deficiencies of the '077 publication to Ohtani. Fukui fails to mention anything about passivating stainless steel surfaces. Instead, Fukui describes a separator for a fuel cell comprising a stainless steel substrate that has a collection of carbonaceous particles adhered to it in a certain distribution.

The '095 document to Heimann, describes a process for forming a specific type of mineral layer upon a metal surface:

> [0016] The instant invention relates to a process for depositing or forming a beneficial surface (e.g. a mineral containing coating or film) upon a metallic surface...By "mineral containing coating"...or "mineral" it is meant to refer to a relatively thin coating or film which is formed upon a metal surface wherein at least a portion of the coating or film comprises at least one metal containing mineral, e.g. an amorphous phase or matrix surrounding or incorporating crystals comprising a zinc disilicate.

This mineral layer, particularly one containing a zinc disilicate, is readily distinguishable from the metal hydroxide layers that result from the methods of the claims at issue.

Furthermore, this mineral layer is deposited from an immersion medium containing a water soluble compound, see paragraphs [0002] and [0007] of the '095 document. In the examples given in the '095 document, these water soluble compounds are rather exotic compounds and are noted as sodium stannate

trihydrate, sodium molybdate dehydrate, ammonium metavanadate, and cerium nitrate hexahydrate.

Thus, the chemistry and resulting mineral layer formed upon the metal substrate taught by Heimann, is significantly different than the metal hydroxide layer formed upon the stainless steel substrate as recited in the claims at issue.

Moreover, if one followed the teachings of the '095 document to Heimann, one would be motivated to add one or more of these exotic compounds to an immersion bath, in order to form the noted mineral layers on a metal substrate. This strategy is entirely different than the methods called for in the claims at issue. "A prima facie case of obviousness can be rebutted if the applicant... can show 'that the art in any material respect taught away' from the claimed invention," *In re Haruna*, 249 F.3d 1327, 58 USPQ2d 1517 (Fed Cir 2001), citing *In re Geisler*, 116 F.3d 1465, 1469, 43 USPQ2d 1362, 1365 (Fed Cir. 1997).

In order to further distinguish the claimed subject matter of claim 5 from the '095 document to Heimann, that claim has been amended to recite that the step of passivation treatment results in a passivation film constituted by hydroxides produced from metal ions constituting the stainless steel thin sheet and hydroxide ions. It is respectfully submitted that this recitation readily distinguishes claim 5 from Heimann, as the Examiner stated that "[t]he mineral layer formed by the process of Heimann [is] not a hydroxide layer." Page 6 of the action. No new matter is added for this amendment since support is found throughout the present application and particularly at page 12, line 24 to page 13, line 5; page 28, second full paragraph; page 41, last full paragraph; page 42; Abstract; and Figures 1 and 8.

For at least these reasons, it will be appreciated that Ohtani in view of Fukui, and further in view of Heimann, are simply not relevant to the method recited in

independent claim 5. Since independent claim 5 is believed to be patentable over the cited art, so too are claims 6-8, dependent therefrom.

C. Rejection of Claim 9 Under 35 USC §103 Based on the '077 document to Ohtani in View of the '598 Patent to Fukui and the '095 Document to Heimann, and Further in View of US Patent 4,497,667 to Vashi Must be Withdrawn

Claim 9 recites in part, that the alkaline solution for cleaning is a solution made by adding a surfactant to a basic salt. However, claim 9 is dependent from previously discussed independent claim 5. And since claim 5 is distinguishable over the cited references to Ohtani, Fukui, and Heimann, then the inquiry becomes whether the '667 patent to Vashi remedies the deficiencies of those references.

The '667 patent to Vashi is directed to a complex mixture of numerous components that forms a cleaning and conditioning solution. The purpose of Vashi's cleaning and conditioning solutions is actually opposite that of the present invention passivating solutions. Instead of forming a protective passivating layer on a metal substrate, as in claim 9 at issue, Vashi teaches that a cleaning and conditioning operation can be performed by applying the noted complex solution. "Conditioning," according to Vashi, refers to activating a surface and grain refining, see col. 1, lines 31-33. These operations are very different than forming a thin protective layer on a surface to prevent the surface from reacting or otherwise undergoing corrosion.

Thus, Vashi teaches away from claim 9. And clearly, Vashi does not remedy the deficiencies of the remaining references. "A prima facie case of obviousness can be rebutted if the applicant... can show 'that the art in any material respect taught away' from the claimed invention," *In re Haruna*, 249 F.3d 1327, 58 USPQ2d 1517

(Fed Cir 2001), citing *In re Geisler*, 116 F.3d 1465, 1469, 43 USPQ2d 1362, 1365 (Fed Cir. 1997).

Accordingly, it is believed that none of the references taken singularly, or in any combination, teaches the subject matter of claim 9. Accordingly, it is submitted that claim 9 is patentable over the cited art.

In light of the foregoing, it is respectfully submitted that the present application is in a condition for allowance and notice to that effect is hereby requested. If it is determined that the application is not in a condition for allowance, the Examiner is invited to initiate a telephone interview with the undersigned attorney to expedite prosecution of the present application.

If there are any additional fees resulting from this communication, please charge same to our Deposit Account No. 18-0160, our Order No. SHM-15962.

Respectfully submitted,

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